

Remarks

The Applicants believe that this amendment places the subject application in better condition for allowance and in so doing introduces no new issues. Therefore, entry of this Amendment, reconsideration of the application, and allowance of all claims pending herein is respectfully requested.

Claims 1-7 were originally presented in the subject application. By the foregoing amendment, the Examiner's noted informalities in the specification have been corrected, and claims 3, 5, and 12 have been amended to more particularly point out and distinctly claim the inventive material of the subject invention. Claims 1-20 remain in this case.

Initially, applicants wish to thank the Examiner for the indication of allowability given original claims 13-14 if rewritten in independent form. The Examiner's concerns are addressed separately below in the order raised in the outstanding Office Action. No new matter has been added.

Objection to the Specification

Each of the objections to the specification noted in the Office Action has been addressed in the specification and claim amendments submitted herewith. No new matter is believed added to the application by any amendment presented herewith.

Rejections under 35 U.S.C. §102

Claims 1, 2, 3, 5, 6, 10 and 11 stand rejected under 35 U.S.C. §102 as anticipated by Campbell (U.S. Patent No. 5,203,122). The Office Action stated:

Campbell discloses a method for delivering a coherent jet of grinding coolant to a grinding wheel (10) being rotated at a selected peripheral wheel speed in a grinding operation, the method comprising; inherently determining a desired flowrate of coolant for the grinding operation; inherently determining coolant pressure required to generate a coolant jet speed approximately equal to the peripheral wheel speed at the coolant flowrate; inherently determining a nozzle discharge area capable of achieving the coolant

jet speed; and providing a nozzle assembly for delivery of a coherent jet of a grinding coolant at the coolant jet speed, wherein the nozzle assembly comprises a plenum means (inherently for producing a pressurized jet) and at least one nozzle (18), the nozzle comprising an axis (which does not have to be in the center of the nozzle), a proximal end having a maximal dimension D, and a distal end portion containing the nozzle discharge area having a longitudinal cross-section of dimension d; the distal portion having a surface disposed at an angle of at least 30 degrees relative to the axis (since an axis may be used which is tilted), and the nozzle characterized by a D:d ratio of at least about 2:1. See figure 1, column 2, lines 11-18, and lines 65-end to column 3, lines 1-23."

(Office Action p.2-3, ¶ 4).

Independent claim 1, from which claims 2, 3, 5, 6, 10 and 11 depend, recites a "method for delivering a coherent jet of grinding coolant to a grinding wheel . . . comprising . . . providing a nozzle assembly for delivery of a coherent jet of a grinding coolant at the coolant jet speed, wherein the nozzle assembly comprises a plenum means and at least one nozzle. . . ."

Applicant respectfully traverses this rejection for the reasons set forth below. It is well settled that there is no anticipation unless (1) all the same elements are (2) found in exactly the same situation and (3) are united in the same way to (4) perform the identical function. Campbell does not disclose elements of claim 1, including the elements of a coherent jet of grinding fluid and a plenum means.

Applicant's independent claim 1 and the Campbell reference clearly do not have the same structural elements. Claim 1 recites a nozzle assembly which includes a plenum means and which is configured to provide a coherent jet of coolant. The nozzle disclosed in the Campbell reference lacks a plenum means and is not configured to deliver a coherent jet. The Campbell reference also does not inherently disclose elements of claim 1. Accordingly, all the elements of the subject invention are not found in exactly the same situation in Campbell, nor are they united to perform the identical function. Applicant therefore submits that Campbell does not anticipate the subject invention as set forth in claim 1.

Coherent jet

Each of the claims which stand rejected under § 102 contain the limitation of a coherent jet of grinding coolant. The preamble and step (d) of independent claim 1, from which claims 2, 3, 5, 6, 10 and 11 depend, recite "a coherent jet of grinding coolant."

"Coherent jet" is defined explicitly in the specification as "a spray that increases in thickness (e.g., diameter) by no more than 4 times over a distance of about 12 inches (30.5cm) from the nozzle exit." (App. at p.7 lines 2-5). This definition controls the term "coherent jet." MPEP § 2111.01, p.2100-50. Therefore, Campbell can not anticipate claim 1 unless it discloses a coherent jet as defined in the specification.

Campbell does not disclose a "coherent jet" of fluid, and makes no meaningful disclosure of the relative dimensions of the spray of coolant fluid. Campbell Figure 1 depicts nozzles with sprays. However, no information is provided as to the dimensions of the sprays, and no reference numbers for these sprays are provided. (Campbell Fig.1).

The Campbell reference also does not inherently disclose a coherent jet stream. "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." MPEP § 2112, p.2100-55. A coherent jet would not necessarily be provided by the nozzles disclosed in the Campbell reference. A coherent jet stream is not necessarily provided by a conventional nozzle, and the Office Action has not provided a basis in reasoning or technical fact to show otherwise.

Plenum Chamber

Campbell also does not disclose the element of a plenum means. Instead, Campbell refers to pressurized filtered sources of coolant/lubricant, without providing additional information. Campbell discloses that "[c]oolant nozzle 16 is located to inject coolant at the point of initial contact between the wheel and the workpiece, while nozzle 18 injects coolant at the point where the wheel and the workpiece separate. These nozzles are fed from pressurized filtered sources of coolant/lubricant which are conventional and not shown." (Campbell col. 2, lines 60-65; Fig. 1).

These filtered sources of coolant/lubricant in Campbell are not part of the nozzle assemblies and are not disclosed as being anywhere near the nozzles. In contrast, the plenum means in the claimed invention is part of the nozzle assembly. The plenum chamber serves to reduce the coolant pressure, minimize turbulent flow and allow a coherent jet to emerge from the nozzles located at the downstream end thereof. "The plenum chamber provides a relatively large transverse cross-sectional area relative to that of the [fluid inlet].... This large area serves to reduce the velocity of coolant entering through inlet 32, and allow the coolant to at least partially stabilize prior to exiting the chamber [via the nozzle(s)]." (Application p. 9 lines 7-10).

A plenum means is also not inherently disclosed by the Campbell reference. "To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference The mere fact that a certain thing may result from a given set of circumstances is not sufficient. . . . the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." 2112, 2100-55. MPEP § 2112 p. 2100-55.

The conventional source of pressurized filtered coolant / lubricant is not necessarily a plenum means. The Office Action has not provided any basis in fact and / or technical reasoning why a plenum means would necessarily flow from the disclosure of a conventional source of pressurized filtered coolant. Conventional sources of coolant include a hose or a pump. "The [prior art] nozzle can be trained or aimed upon the location of contact and is connectable to a source of coolant, e.g., by a hose." (Application at p.1 lines 22-23). Kazui (U.S. Patent No. 5,390,446) discloses a pump. "[T]he coolant supply mechanism includes the nozzle 12 for injecting the coolant . . . [and] a pressure pump (not shown) for pressurizing the coolant. . . ." (Kazui col. 1 lines 29-31). Therefore, Campbell does not inherently disclose a plenum means.

Dependent claims 3 and 5

Claims 3 and 5 have been provided with clarifying amendments. In particular, claim 3 has been amended to replace 'power consumption' with 'a measure of power consumed' to make clear that such measurement is used to determine a desired flowrate as specified in claim 1. Claim 5 has been amended to make clear that the asymmetrical transverse cross-section of the

claimed nozzle is 'non-circular'. Support for these amendments may be found in the claims (e.g., claims 3, 5, and 6) as originally filed, and in the specification (e.g., p.15, line 15 to p.16, line 5) and figures (e.g., Fig. 3) as filed, such that no new matter has been added and no new search is required.

For the above stated reasons, independent claim 1 is believed patentable over the art of record. Dependent claims 2, 3, 5, 6, 10 and 11 are believed allowable for the same reasons as the independent claim from which they depend, as well as for their own additional limitations.

Rejections under 35 U.S.C. §103:

Claim 12

Claim 12 stands rejected under 35 U.S.C. §103(a) as unpatentable over Campbell (U.S. Patent No. 5,203,122). The Examiner noted that "Campbell does not disclose a plenum chamber, which comprises a modular front plate removably fastened to a downstream side of the plenum chamber. However, as stated above, any plenum or pump for applying pressure for creating the jet will be a 'chamber', and to make portions of the chamber removable for cleaning inside the 'chamber' it would have been obvious to one having ordinary skill in the art at the time the invention was made." (Office Action p.4 ¶ 6).

Claim 12 has been amended to state that the "modular front plate is configured to modify said nozzle assembly." Support for this amendment is found the Specification as filed, such that no new matter has been added and no new search is required. For example, the Specification discloses that the plenum front plate allows distinct configurations of nozzles to be easily interchanged. "As shown in Figs. 5A, 5B and 5C, nozzle plate 38 is configured for being removably fastened . . . to [plenum] chamber 30. The plate 38 also includes a plurality of nozzles 20, 20' disposed in a predetermined arrangement therein. This construction enables provision of various plates 38 having distinct configurations of nozzles 20, 20', which may be easily interchanged . . . with a common plenum chamber 30, to serve as modular means for accommodating various grinding operations." (Application p.10 lines 1-9, Figs. 5A, 5B, 5C).

Campbell does not teach or suggest this characteristic. Therefore, to the extent the

rejection is still relevant in light of amended claim 12, this rejection is respectfully traversed.

It is well established that in order to make out a prima facie case of obviousness, the prior art references must teach or suggest all of the claim limitations. MPEP § 2142. As discussed above in reference to the § 102 rejection, Campbell does not teach a plenum chamber. Instead, Campbell teaches a conventional source of pressurized filtered coolant, which is not shown in the drawings. (Campbell col. 2, lines 60-68, through col.3, line 41; Fig.1).

In addition, Campbell also does not teach or suggest a modular front plate removably fastened to a plenum chamber. The Office Action states that a plate on the chamber could be made removable for cleaning. However, a pump plate removable for cleaning would not necessarily be modular and would not be configured to modify the nozzle assembly.

Therefore, Campbell does not teach or suggest the claimed invention. A prima facie case of obviousness has therefore not been made. For each of the foregoing alternate reasons, applicants respectfully request reconsideration and allowance of amended claim 12 presented herewith.

Claim 4

Claim 4 stands rejected under § 103(a) as unpatentable over Campbell in view of Hill (U.S. Patent No. 6,123,606). The Examiner stated that "Campbell does not disclose [that] determining coolant pressure comprises determining a number and pitch of nozzles. However, Hill et al disclose that it is known to use one or two nozzles for cooling the peripheral surface a grinding wheel." (Office Action at p. 5, ¶ 7). The Examiner concluded that it would have been obvious "to have modified the method of Campbell by determining a number and pitch of nozzles since Hill et al discloses that two nozzles may be used to replace one nozzle incapable of adequately cooling the peripheral surface of the grinding wheel." (Office Action at 5, ¶ 7).

Claim 4 recites "[t]he method of claim 1, wherein said determining coolant pressure comprises determining a number and pitch of nozzles." The cited references do not teach or suggest this characteristic. Therefore, the applicant respectfully traverses this rejection.

It is well established that in order to make out a prima facie case of obviousness, the prior art references must teach or suggest all of the claim limitations. MPEP § 2142. Hill teaches the

use of two nozzles to cover a wider area, not to determine the coolant pressure. "For example where a grinding wheel much wider than the width of a single nozzle is used, then two such nozzles may be mounted side-by-side to produce a combined coolant/lubricant jet spanning the whole width of the wheel." (Hill col. 3 lines 27-35). Therefore, Hill does not teach or suggest the use of the number and pitch of nozzles to determine coolant pressure.

Furthermore, Hill teaches away from the invention. Unlike the claimed invention, which involves "determining [a] coolant pressure required to generate a [desired] coolant jet speed," Hill appears to simply focus on providing as high a coolant pressure as possible. Hill discloses that "[t]he significant enhancement of the invention seems principally to be dependent upon the extremely high, by conventional standards, coolant pressure as well as the positioning of the coolant jet in conjunction with a porous wheel." (Hill col.4 lines 14-17). Hill then teaches that even further increases in pressure may offer enhanced benefits. "It may be that with still higher coolant delivery pressures that the desired effect may be achieved over a greater range...." (Hill col.4 lines 23-25).

Therefore, the cited references do not teach or suggest the claimed invention and in fact teach away from the claimed invention. A *prima facie* case of obviousness has therefore not been made. For each of the foregoing alternate reasons, applicants respectfully request reconsideration and allowance of claim 4.

Claims 1-3 and 8-12

Claims 1-3 and 8-12 stand rejected under § 103 as unpatentable over Kazui (U.S. Patent No. 5,390,446) in view of Morris (U.S. Patent No. 3,104,826). The Examiner stated:

Kazui et al discloses a method for delivering a coherent jet of grinding coolant to a grinding wheel (1) being rotated at a selected peripheral wheel speed in a grinding operation, the method comprising; inherently determining a desired flowrate of coolant for the grinding operation; inherently determining coolant pressure required to generate a coolant jet speed approximately equal to the peripheral wheel speed at the coolant flowrate; inherently determining a nozzle discharge area capable of achieving the coolant jet speed; and providing a nozzle assembly for delivery of a coherent jet of a grinding

coolant at the coolant jet speed, wherein the nozzle assembly comprises a plenum means (inherently for producing a pressurized jet) and at least one nozzle (12). (Office Action p.5-6, ¶ 8).

The Examiner noted that Kazui does not disclose a nozzle which comprises "an axis, a proximal end having a maximum dimension D, and a distal end portion containing the nozzle discharge area having a longitudinal cross section of dimension d; the distal portion having a surface disposed at an angle of at least 30 degrees relative to the axis, and the nozzle characterized by a D:d ratio of at least about 2:1." (Office Action p.6, ¶8).

The Examiner further stated that "Morris discloses a nozzle for supplying a coolant in a grinding (cutting) operation, the nozzle comprising an axis, a proximal end having a maximum dimension D, and a distal end portion containing the nozzle discharge area having a longitudinal cross-section of dimension d; the distal portion having a surface disposed at an angle of at least 30 degrees relative to the axis, and a nozzle characterized by a D:d ratio of at least about 2:1." (Office Action p.6, ¶8).

The Examiner concluded that "it would have been obvious . . . to have modified the method of Kazui et al by replacing the nozzle(12) used therein with the nozzle disclosed by Morris in order to provide more effective cooling of the grinding wheel." (Office Action p.6 ¶ 8).

It is well established that in order to make out a *prima facie* case of obviousness, the prior art references must teach or suggest all of the claim limitations. MPEP § 2142. The cited references do not teach or suggest, among other things, a plenum means or a coherent jet, and do not make inherent disclosures attributed to them in the Office Action. The cited references also do not teach or suggest "a nozzle characterized by a D:d ratio of at least about 2:1." Therefore, Applicant respectfully traverses this rejection.

First, Kazui does not teach or suggest a coherent jet or a plenum means. The Kazui reference does not disclose a coherent jet. Kazui also teaches a pressure pump rather than a plenum means. "As seen from Fig. 7, the coolant supply mechanism includes the nozzle 12 for injecting the coolant in the tangential direction of grindstone 1, a pressure pump (not shown) for pressurizing the coolant. . ." (Kazui col. 1 lines 29-31).

Also, the Office Action has not provided a basis in fact or technical reasoning to support the assertion that Kazui inherently discloses elements of the claims at issue. "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." MPEP § 2112, p.2100-55. Since the Office Action has not shown that the allegedly inherent characteristics necessarily flow from the disclosures, these characteristics can not be said to be inherently disclosed by the cited references.

Morris does not disclose a nozzle with a D:d ratio of 2:1. The specification does not disclose such proportions. Morris Figure 1 does not show the proportions to scale. Drawings which are not drawn to scale can not be used as prior art. "When the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value." MPEP § 2126, p.2100-66.

Furthermore, Morris teaches away from the invention because it does not use a coherent jet. An "object [of the Morris invention] is to provide a novel device which will dispense coolant fluid in an effective particulate or 'atomized-mist' form." (Morris at col. 1 lines 57-59). "The coolant is dispensed from the discharge head in a particulate or 'atomized-mist' nature." (Morris col.2 lines 41-42). In contrast, the coherent jet stream of claimed invention creates "relatively low dispersion . . . [which] generally reduces misting of the coolant spray." (Application p.7 line 30, p. 8 lines 3-4).

The elements of the claims at issue are not taught or suggested by the cited references, and Morris actually teaches away from the claimed invention. A *prima facie* case of obviousness has therefore not been made. For each of the foregoing alternate reasons, applicants respectfully request reconsideration and allowance of claims 1-3 and 8-12.

CONCLUSION

Applicant submits that the dependent claims are allowable for the same reasons as the independent claims from which they directly or ultimately depend, as well as for their additional limitations. Applicant therefore further submits that all of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot.

This application is now believed to be in condition for allowance, and such action at an early date is respectfully requested. However, if any matters remain unresolved, the Examiner is encouraged to contact the undersigned by telephone.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 50-0734** referencing docket no. BG-4114/1086.023D. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,



Richard L. Sampson
Attorney for Applicants
Registration No. 37,231

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SAMPSON & ASSOCIATES, P.C.
50 Congress Street
Suite 519
Boston, MA 02109
Telephone: (617) 557-2900
Facsimile: (617) 557-0077